

SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

Waste Not

Manure management is a serious issue.

Nobody wants to talk about it — much less live near it — because cattle, swine and poultry waste smell bad, threaten water supplies and reduces farm profits. Land-Grant universities and the USDA are helping livestock producers reduce, recycle and mitigate the negative impacts of this unglamorous agricultural byproduct.

Payoff

- **“Entremanures.”** Although not always possible, changing waste into an asset is the best solution. **Purdue** helped pig producers refine manure management plans that allowed them to sell their manure to Indiana crop farmers. The manure saved farmers \$30 per acre in commercial fertilizer costs and helped keep manure nitrogen out of the water supplies. **Iowa State** researchers found a way to mix air-dried cattle manure with soybean-based adhesives to make fiberboard. This process could be used to replace scarce wood fiber in the \$1.2 billion fiberboard market. **Maryland** and **Ohio State** researchers are helping poultry producers turn manure and litter into compost that can be sold to plant nurseries and greenhouses. **Mississippi** helped kill two waste products with one stone by combining lumber mill and poultry waste into a valuable soil amendment.
- **Odor eaters.** As suburbs encroach on farmland, more people are discovering the problem with farm fresh air — it includes the smell of manure. Though it can't be completely eliminated, Land-Grant university researchers are looking at ways to reduce the odor. **Purdue** and **Missouri** researchers found by manipulating hog diets with a low-protein, soy-hull diet supplemented with synthetic amino acids they could reduce ammonia emissions (the smelly part) from manure by one-third. **Michigan State** researchers found that ozonating manure before spreading it on fields as fertilizer removes most of the odor and reduces the number of disease-spreading flies. **Minnesota** produced the Farmstead Odor Database to track air quality and odor complaints for the state's 40,000 livestock producers. Until now, odor control was highly politicized and subjective. The database allows the state to more accurately address the issue. **Tennessee** is experimenting with bioreactors that will reduce the volatile fatty acids responsible for many odors in manure lagoons.

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This method should offer a cost-effective alternative to enlarging lagoons. **Florida** research found a way to reduce the odor by using anaerobic bacteria digesters and to use the methane the digesters produce to heat water for the campus dairy research unit.

- **Putting manure to work.** **Minnesota** found that hog manure applied to the state's million acres of corn increased profitability \$31 million a year by increasing yields and replacing 100 million pounds of commercial nitrogen fertilizer applications. **New Hampshire** found that effective use of manure would save the state's farmers more than \$22.5 million per year.

- **Spreading the wealth.** One of the best ways to manage manure is to spread it around as fertilizer. Not all areas are suitable for this because of the risk of water pollution. **Arkansas** developed the Animal Waste Pollution Potential Index that uses Geographic Information Systems to help farmers quickly identify areas that would be at risk for groundwater pollution. **Connecticut** is using a similar program to help the state's dairy farmers make Best Management Practices decisions for liquid waste reduction. **Purdue** designed a high-tech manure spreader that is tied to Global Positioning System technology to apply manure more precisely. **Virginia's** NutMan nutrient management software has helped the state's farmers more accurately and safely use manure as fertilizer while protecting the state's streams and lakes. **American Samoa Community College** is teaching pig producers composting methods to reduce waste runoff that pollutes the island of Tutuila's few remaining freshwater streams. **Oregon State** researchers are experimenting with constructed wetlands to reduce the effects of pig and dairy waste. If implemented, this could save these livestock operations \$800,000 per year compared to their current disposal methods. **Utah State's** Little Bear River project kept 900,000 pounds of phosphorus and 140,000 of nitrogen per year out the river by helping 36 animal feed operations redesign their manure containment facilities.

- **Too much of a good thing.** Although nitrogen and phosphorus are essential to plant growth, too much of these nutrients will damage water quality and kill

aquatic plants and animals. More careful disposal is one method, but reducing the amount of phosphorus in manure is even better. **Maryland** research found that adding probiotic nutrition supplements to poultry feed can reduce nitrogen and phosphorus in their manure 20 percent while improving poultry health. **Missouri** and **Virginia** studies found that adding the enzyme phytase to hog and poultry rations reduces manure phosphorus 30 percent to 50 percent.



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